

Cold Ironing BP's Alaskan Class Tankers at BP's Berth 121 in the Port of Long Beach

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Cold Ironing BP's Alaskan Class Tankers at Berth 121

Agenda –

- ❖ Summary
- ❖ Background
- ❖ Why cold ironing makes sense at B-121
- ❖ How it will work
- ❖ Emissions Reductions
- ❖ Schedule
- ❖ Summary



Cold Ironing BP's Alaskan Class Tankers at Berth 121

Summary –

- ❖ Unique opportunities makes application of cold ironing at B-121 feasible
 - Berth infrastructure
 - Vessel design
 - Vessel visit frequency
 - POLB support
- ❖ Cold ironing is not a universal solution to reduce oil tanker emissions
- ❖ Regulations should not dictate which technology is used to achieve emission reductions
- ❖ Cold ironing is more expensive, making voluntary participation less likely without incentives such as emission reduction credits

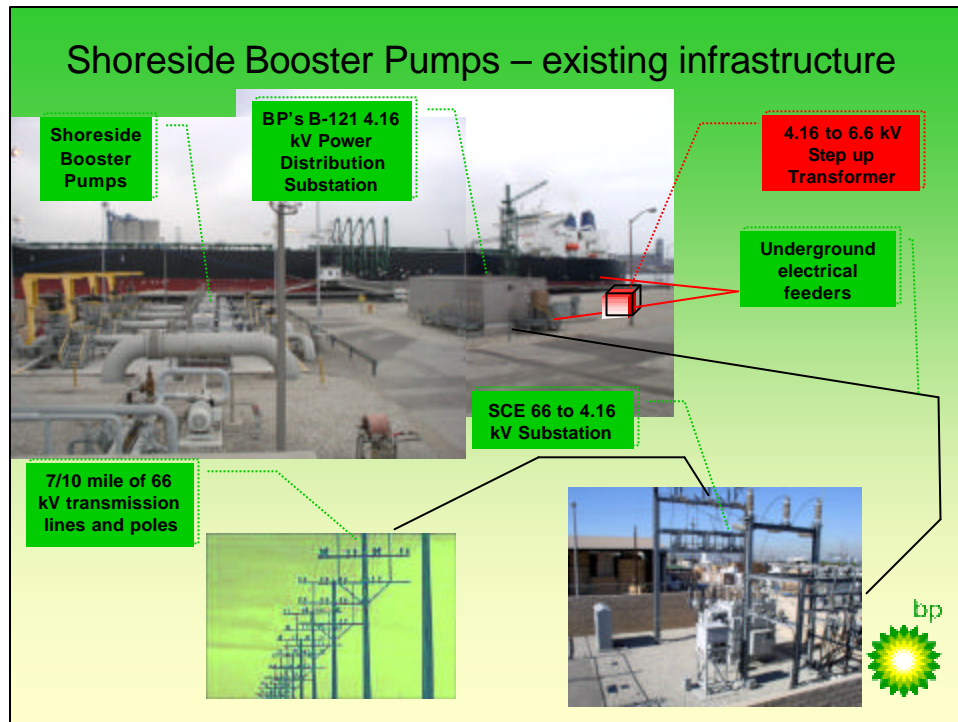


Why Cold Ironing Makes Sense at Berth 121



Shoreside Booster Pumps – existing infrastructure





Vessel Design

❖ Potential emission savings vary by tanker type

- During discharge cargo operations:
 - ✓ Steam ships and motor ships derive nominally 5% of their energy from electricity
 - ✓ Diesel electric vessels derive nearly 100% of their energy from electricity
 - ✓ Since 1998, Berth 121 has had 1143 ship calls – less than 10 of these have been from diesel electric vessels
 - 3 of these ship calls have been the Alaskan Frontier over the last 2 months

bp

Vessel Dimensions

ΠActual B-121 vessel Length Over All (LOA) can vary from 700 to 1100 feet

ΠAlaskan Class LOA is 950 feet

ΠSimple issue – our design is focused around meeting a +/- 11 feet location of the ship's electrical connections



Vessel Dimensions

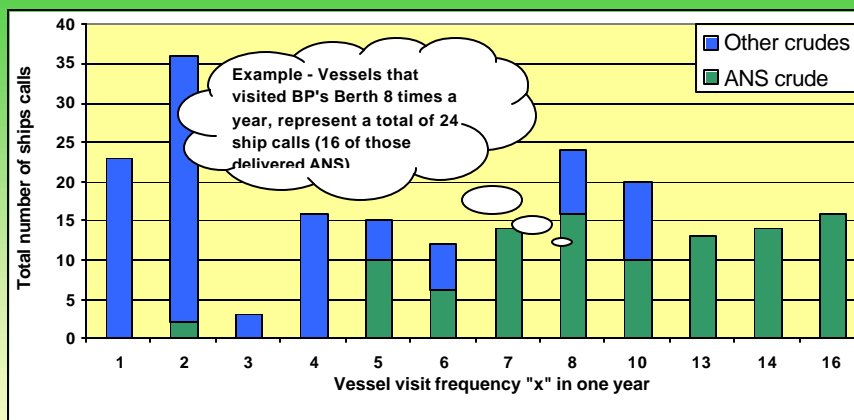


Voltage Level on Tankers

- ✓ Our design is set to deliver 6.6 kV power consistent with the electrical level onboard the Alaskan Class vessels.
- ✓ Other vessels operate at voltage levels from 480 V up to 6.6 kV



Vessel Visit Frequency to Berth 121



How it will work

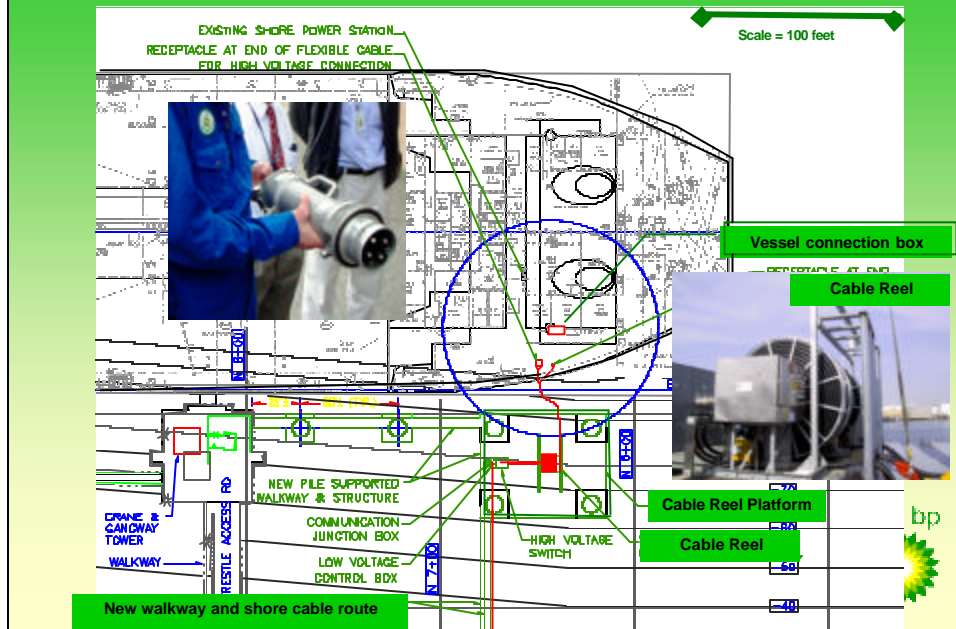


Design Requirements

- ❖ SAFETY, SAFETY, SAFETY!
- ❖ No impact to berth operations :
 - During construction or from final design
- ❖ Connection basics :
 - Plugs and cables must be suitable for marine environment
 - Vessel alignment for initial connection capable of +/- 11 feet fore and aft
- ❖ Connection must be sufficiently automated to :
 - Minimize vessel crew / Require only 1 terminal employee to deliver cables
 - Enable connection & energizing process in < 2 hours
 - Allow for bumpless transfer (no blackout)
- ❖ During cargo operations the system must allow for :
 - Overall change in height of 46 feet
 - Limited movement – 4 feet in either direction
 - Support of cables throughout discharge; no tension on plugs
 - Emergency shut down of power supply and disconnect



How it will Work



Vessel Generators MAN B&W 6L48/60 – 6.3MW



Emissions Reductions to be Achieved

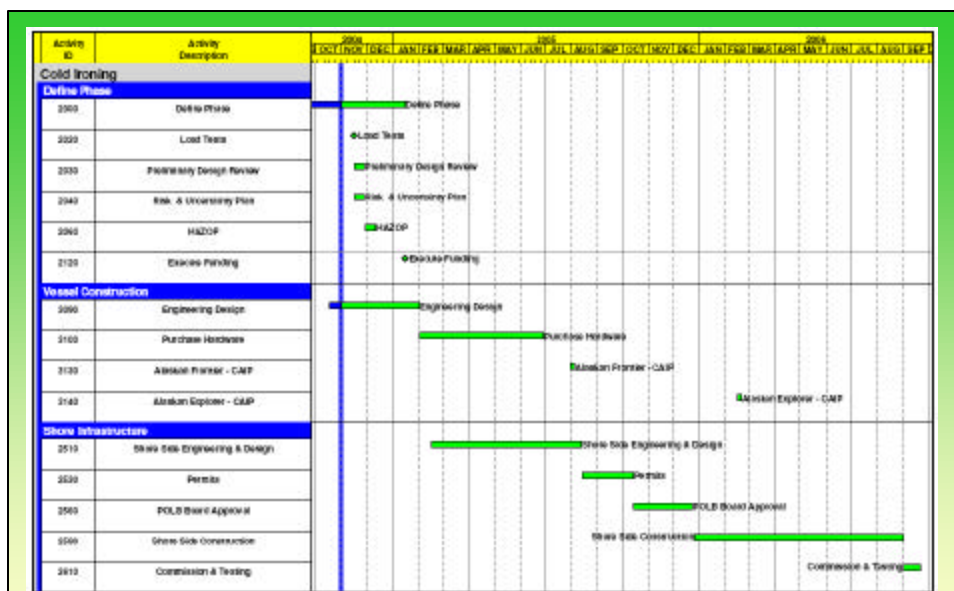


Expected Emission Savings

Scenario	Estimated Emission Reductions (short tons/ship call)					
	Incremental to base case					
	Net GHG	NOx	CO	PM	ROG	SOx
BASE CASE: No changes No SSP's	0	0	0	0	0	0
COLD IRONING – 2 Alaskan Class Vessels No SSP's	78.3	2.2	0.27	0.08	0.40	1.6



Project Schedule



Project Schedule

Cold Ironing BP's Alaskan Class Tankers at Berth 121

Summary –

- ❖ The stars have aligned to make cold ironing feasible for the Alaskan Class vessels at Berth 121
 - Infrastructure in place for Shoreside Booster Pumps
 - Diesel electric vessel design
 - Vessel visit frequency for ANS fleet
 - Shared capital expense with POLB
- ❖ Cold ironing is clearly not a universal solution to reduce oil tanker emissions
- ❖ Regulations should not dictate which technology is used to achieve emission reductions
- ❖ Cold ironing is a more expensive option making voluntary participation less likely – use of emission reduction credits could help offset this expense and provide short-term incentives

